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Date: 18 Sept 2007

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF APPEALS AND INTERFERENCES

In re application of	
NICHOLAS J. ADAMS	
Serial No. 10/797,223	Group Art Unit: 1764
Filed March 10, 2004	Examiner: Prem C. Singh
PROCESS FOR PREPARING A LUBRICATING BASE OIL AND A GAS OIL	September 18, 2007

COMMISSIONER FOR PATENTS
P. O. Box 1450
Alexandria, VA 22313-1450

Sir:

APPEAL BRIEF

This brief is filed in support of Applicant's appeal from the Examiner's action dated July 16, 2007, finally rejecting claims 1-9 in the above-identified U.S. patent application. A notice of appeal from this decision is being filed by Applicant concurrently with this appeal.

Please charge the fee for filing this brief to Shell Oil Company Deposit Account No. 19-1800.

It is respectfully requested that the Board reverse the final rejection of claims 1-9 of the above-identified application for the reasons discussed below.

REAL PARTY IN INTEREST

The invention described and claimed in the above-identified patent application is assigned to Shell Oil Company, which is the real party in interest in the present appeal.

RELATED APPEALS AND INTERFERENCES

Appellant and Appellant's legal representatives are not aware of any related appeals or interferences.

STATUS OF CLAIMS

Claims 1-9 have been rejected and are the subject of this appeal.

Claim 10 has been canceled.

A copy of all of the claims on appeal can be found in the Claims Appendix.

STATUS OF AMENDMENTS

In the Office action of July 16, 2007 it is stated that: "Amendment to claims 1-5, and 9 and cancellation of claim 10 is noted. Since no objections to the amendments were raised in the subject Office action, Appellant assumes they were entered.

SUMMARY OF CLAIMED SUBJECT MATTER

The present invention is directed to a single step process for preparing both a lubricating base oil and a gas oil in high yields from waxy feeds. The inventive process uses a particular type of catalyst (i.e., a catalyst containing a zeolite having 12 oxygen-ring defined pores) and yields more gas oil and less gaseous by-products than state of the art processes (Specification, page 2, lines 22-32 and page 3, lines 4-9). With the present process the gas oil product yield is larger than the fraction boiling below the gas oil fraction. Also, the gas oil product obtained by this process has very good cold flow properties like cloud point and cold filter plugging point (Specification, page 3, lines 9-18).

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The rejection of claims 1-9 under 35 U.S.C. §103(a) as being unpatentable over Van Ballegoy et al (WO 00/29511) in view of Chen et al (Molecular Transport and Reaction in Zeolites, Table 2.1, page 11, John Wiley and Sons, 1994).

ARGUMENT

The rejection of claims 1-9 under 35 U.S.C. §103 (a) as being unpatentable over Van Ballegoy et al (WO 00/29511) in view of Chen et al (Molecular Transport and Reaction in Zeolites, Table 2.1, page 11, John Wiley and Sons, 1994) is erroneous and should be reversed.

The present invention is directed to a process for preparing both lubricating base oils and gas oil in a single process step from waxy fuels. The inventive process uses a particular type of catalyst (i.e., a catalyst containing a zeolite having 12 oxygen-ring defined pores) and yields more gas oil and less gaseous by-products than state of the art processes (Specification, page 2, lines 22-32 and page 3, lines 4-9). With the present process the gas oil product yield is larger than the fraction boiling below the gas oil fraction. Also, the gas oil product obtained by this process has very good cold flow properties like cloud point and cold filter plugging point (Specification, page 3, lines 9-18). The present specification contains a comparative example which demonstrates that practice of the present process utilizing a catalyst containing a zeolite having 12 oxygen-ring defined pores (e.g., a MTW-Type zeolite) produces a far greater yield of gas oil product and a far less yield of products boiling below the gas oil fraction than a process having a state of the art MTT-type zeolite (Specification, pages 11-13, Example 1 and Comparative Experiment A).

The Cited References

Van Ballegoy et al, the primary reference, discloses a process for catalytically dewaxing a hydrocarbon feed to produce lubricating base oils in high yield. The invention in Van Ballegoy et al is based on the finding that the use of a relatively low ratio of metallosilicate crystallites to binder (i.e., between 5:95 and 35:65), results in a higher yield of base oil product at the same weight hourly space velocity than if a higher ratio of metallosilicate crystallites to binder were used (Page 2, lines 1-6).

Van Ballegoy et al discloses that a wide variety of metallosilicate crystallites can be employed to make catalysts useful in the claimed catalytic dewaxing process. Preferred metallosilicate crystallites are aluminosilicate crystallites having a pore diameter in the range of from 0.35 to 0.80 nm (Page 7, lines 5-15).

Preferred aluminosilicate crystallites are said to include MFI-type zeolites, e.g., ZSM-5, silicalite, offretite, and zeolites of the ferrierite group, such as ZSM-35 and ferrierite (Page 7, lines 15-20).

Another preferred class of aluminosilicate zeolite crystallites are said to include TON-type zeolites, such as ZSM-22, Theta-1 and Nu-10 (Page 7, lines 21-24).

A further preferred class of aluminosilicate zeolite crystallites are said to include MTW-type zeolites, such as ZSM-12, Nu-13, TEA silicate, TPZ-3, TPZ-12, VS-12,and Theta-3 (Page 7, lines 25-29).

A next preferred class of aluminosilicate zeolite crystallites are said to include MTT-type zeolites, such as ZSM-33, SSZ-32, ISI-4, KZ-1, EU-1, EU-4 and EU-13 (Page 7, line 30 to page 8, line 1).

The Van Ballegoy reference contains thirteen examples and three comparative experiments using various catalysts containing ZSM-5, ZSM-12, SSZ-32, TON-type zeolites. The yields and properties of the lubricating base oil product obtained in these examples and comparative experiments is shown in Table II, III, V, VIII, X and XII. There is no disclosure in Van Ballegoy relating to the use of these catalysts to obtain a gas oil product in addition to obtaining a lubricating base oil product. In fact there is no mention of gas oils anywhere in the Van Ballegoy et al reference.

Chen et al, the secondary reference, contains a table showing various available zeolite structures including many of the zeolites disclosed in Van Ballegoy et al. However, Chen et al, like Van Ballegoy et al, makes no mention of gas oils, and does not disclose which of the numerous zeolite structures listed could be used to make gas oils as well as lubricating base oils in high yields.

Turning now to the rejection, the Examiner acknowledges that the "Ballegoy invention does not specifically mention that the gas oil yield is higher than the lower boiling fraction." In fact, as discussed above, Van Ballegoy et al <u>does not mention gas oil at all</u>, or that a gas oil yield is desired. In each of the examples of Van Ballegoy et al where product was obtained, the product obtained is described as a <u>lubricating base oil product</u> (See page 18, lines 20-23; page 19, lines 3-5, lines 11-14 and 28-31; page 21, lines 1-3 and 15-17; page 22, lines 1-2 and 8-10; page 23, lines 19-21; page 27, lines 19-21; page 28, lines 21-23 and page 29, lines17-19).

A key feature of Appellant's invention is the use of a catalyst containing a zeolite having 12 oxygen-ring defined pores, such as ZSM-12, to produce a <u>gas oil product</u> in a yield higher than the yield of the fraction boiling below the gas oil product.

The Examiner points out that the "Ballegoy invention uses MTW-type crystallites like ZSM-12", which is correct. However, ZSM-12 is only one of many zeolite catalysts disclosed in Ballegoy et al. Moreover, the "Ballegoy invention" is directed to producing a lubricating oil product in a high yield. Ballegoy et al is not at all concerned with producing a gas oil product. (See page 19 lines 11-14 and 28-30, and Table II, page 20 of Ballegoy et al which shows the yield of lubricating oil product). The numerous zeolite catalysts which are said to be useful in the Ballegoy invention include not only ZSM-12, but also MFI-type zeolites, such as ZSM-5, silicalite, offretite, and zeolites of the ferrierite group, such as ZSM-35 and ferrierite (Page 7, lines 15-20), TON-type zeolites, such as ZSM-22, Theta-1 and Nu-10 (Page 7, lines 21-24) and MTT-type zeolites, such as ZSM-33, SSZ-32, ISI-4, KZ-1, EU-1, EU-4 and EU-13 (Page 7, line 30 to page 8, line 1).

ZSM-5, a MTT-type zeolite is used in Examples 1, 4, 6, 8, 9, 10, 11, 12, 13 and Comparative experiments A and D. SSZ-32 is used in Example 3 and Comparative experiment B. A TON-type zeolite is used in Example 5 and Comparative experiment C.

Ballegoy et al makes no distinction between MFI-type zeolites, MTT-type zeolites and TON-type zeolites all of (which have 10 oxygen-ring defined pores) and MTW-type zeolites (which have 12 oxygen-ring defined pores). An MTT-type zeolite (SSZ-32) is shown in Example 3 of Ballegoy et al to be capable of producing a lubricating base oil product in a high yield (e.g. 85.7 wt% as shown in Table III, page 21 of Ballegoy et al), Applicant has found that MTW-type zeolites having 12 oxygen-ring defined pores are unexpectedly more effective than MTT-type zeolites in producing a gas oil product and a lubricating oil product. As shown in Table 2, page 13 of the present application, the MTW-type zeolite produces 20.9 wt% gas oil plus 62.8 wt % lubricating base oil, while the MTT-type zeolite produces only 8.8 wt% gas oil and 51.3 wt% lubricating base oil. This finding of a superior yield of gas oil with MTW-type catalysts is not at all obvious from Ballegoy et al, which is not concerned with producing a gas oil product, and which teaches MFI-type zeolites, MTT-type zeolites, TON-type zeolites and MTW-type zeolites are all suitable in producing lubricating base oils in high yield, as long as the zeolite to binder ratio is low, e.g. between 5:95 and 35:65, preferably between 10:90 to 30:70.

Apparently recognizing that Ballegoy et al makes no mention of gas oil products, and does not teach how one would produce a gas oil product in a yield which is larger than the yield of the fraction boiling below the gas oil fraction, the Examiner cites page 17, lines 14-21 of Ballegoy et al which discloses "The cut point(s) of the distillate fractions is/are selected such that each product distillate recovered has the desired properties for its envisaged application. For lubricating base oils the cut point will normally be at least 280°C and will normally not exceed 400°C, the exact cut point being determined by the desired product properties, such as volatility, viscosity, viscosity index, and pour point."

However, since the stated purpose of the catalytic dewaxing process in Ballegoy et al is to obtain lubricating base oil products in high yields, and since the product obtained in each of the examples in Ballegoy et al is a lubricating base oil product, the above cited disclosure concerning selecting cut points to recover products having desired product properties, clearly refers to desired lubricating base oil products. There is no indication in Ballegoy et al that a gas oil product is ever produced. If a gas oil product is not produced, one cannot select a cut point to isolate and recover a gas oil product. Thus, the above cited disclosure does not teach or suggest producing a gas oil product with a yield which is larger than the fraction boiling below the gas oil fraction.

On page 4 of the subject Office action the Examiner the takes the position that: "Since Ballegoy invention discloses the exact cut point of the distillates is determined by the desired product properties and the lubricating base oil has a boiling range of 280°C to 400° and also the Ballegoy invention uses a feed with a boiling range of 202°C to 587°C (Page 28, Table IX), it would have been obvious to one skilled in the art at the time the invention was made to modify the Ballegoy invention and cut a lubricating base oil and a larger portion of gas oil as compared to the lighter fraction because gas oil is a more value-added product as compared to lighter components."

The Examiner's position is untenable for several reasons. The wax containing feedstock shown in Table IX is used in Example 12 of Ballegoy et al to make a lubricating base oil product, the properties of which and the catalytic dewaxing yield are shown in Table X on page 29.

In Example 12 of Ballegoy et al it is stated that the "Gaseous components were separated from the effluent by vacuum flashing at a cutting temperature of 390°C" (Underlining added). Since, as recognized by the Examiner, Ballegoy teaches that a cut point of 280°C to 400°C produces lubricating base oils, it is clear the product produced at a cutting temperature of 390°C in Example 12 is a lubricating base oil product. There is no gas oil produced in this example or lighter fraction other than the 1.1 wt % gas make.

Since Ballegoy et al is interested in maximizing the yield of lubricating base oil and minimizing gas make, there is no logical basis for the assertion that these disclosures would somehow make it obvious "to cut a lubricating base oil and a larger portion of gas oil compared to the lighter fraction because gas oil is a more value-added product as compared to lighter components." There is no gas oil made in Example 12 in Ballegoy et al, and there is no motivation provided by this reference to produce "a larger portion of gas oil", since Ballegoy et al is interested in maximizing the yield of lubricating base oil.

Thus, the Examiner's basis for the obviousness rejection of claim 1, and all the claims that are dependent thereon, is untenable and should be reversed, which action is respectfully requested.

CONCLUSION

For all the above stated reasons, claims 1-9 of the present application are believed to be patentable over the cited references. Accordingly, it is respectfully requested that the action of the Examiner in finally rejecting these claims, be reversed, and that the application be passed to issue.

Respectfully submitted,
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CLAIMS APPENDIX

The following claims are under appeal:

1. A single-step process for converting a petroleum derived wax to provide a high yield of gas oil, wherein said single-step process comprises: contacting, under catalytic dewaxing conditions, said petroleum derived wax with a catalyst composition comprising a platinum component, wherein the platinum is present in said catalyst composition in the range of from 0.1 to 5.0% by weight, a silica binder and zeolite crystallites having pores consisting of 12 oxygen atoms, wherein the zeolite crystallites have a constraint index (CI) larger than 1 and wherein the weight ratio of said zeolite crystallites to said silica binder is in the range of from 5:95 to 95:5; and yielding a product effluent comprising a base oil fraction and a gas oil fraction wherein said gas oil fraction is larger than the fraction of said product effluent boiling below said gas oil fraction.

2. A process according to claim 1, wherein the petroleum derived wax feed has an oil content of between 0 and 50 wt%.

3. A process according to claim 2, wherein the petroleum derived wax feed has an oil content of between 0 and 20 wt%.

4. A process according to claim 3, wherein the petroleum derived wax feed is a slack wax or a foots oil.

5. A process according to claim 4, wherein the petroleum derived wax feed contains less than 10 ppmw organic nitrogen.

6. A process according to claim 5, wherein the zeolite crystallites have a constrain index (CI) larger than 1.5.

7. A process according to claim 6, wherein the zeolite crystallites have a constrain index (CI) smaller than 7.

8. A process according to claim 7, wherein the zeolite is of the OFF or MTW type.

9. A process according to claim 8, wherein the zeolite content of said catalyst composition is in the range of from 5 to 35 wt%.

EVIDENCE APPENDIX

None

RELATED PROCEEDINGS APPENDIX

None